



Air Force SBIR Update



Our Opportunity & Challenge

Each of us remembers with crystal clarity where we were and what we were doing on the morning of 11 September 2001. Most of us "middle-agers" know exactly where we were and what we were doing on the afternoon of 22 November 1963. And many of our parents and grandparents know where they were and what they were doing on 7 December 1941.

Three disparate dates, three disparate actions, one common response — "...one nation, under God, indivisible, with liberty and justice for all."

Recently, many folks, from congressmen to small business owners have asked, can the SBIR program be used to help improve homeland defense and fight terrorism.

Yes, We Can

We can because the program has the flexibility to focus our topics each year on our changing requirements. Because the SBIR program is designed



Stephen Guilfoos
Air Force SBIR
Program Manager

to develop building block technologies and not acquire end products, we

can focus our topics on technologies that can be adapted to the military missions of homeland defense and fighting terrorism. Our laboratories will design their programs to be responsive to future

capability requirements as they envision new and improved methods. In concert, they will generate SBIR topics to fill in those technological gaps so that, as future SBIR projects come to fruition in four or five years, those SBIR technologies will more easily fit into the new systems and subsystems.

Yes, We Are

The Air Force Research Laboratory has set aside a portion of our FY03 topics to specifically address homeland defense and anti-terrorism requirements. Even though the FY2002 topics were

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SBIR Program Manager Garner's Tibbetts Award



Robert D. Hancock, SBIR program manager at Kirtland AFB, New Mexico, received the prestigious U.S. Small Business Administration's Tibbetts Award during October ceremonies in Washington, DC.

Hancock received the award for advancing small business participation in SBIR for programs associated with directed energy and space vehicle research.

Hancock has headed the SBIR Program at Kirtland since 1986. "Bob pays attention to details and works the program," said Dr. William P. Latham, technical advisor with the Directed Energy

Directorate's Laser Effects Research Branch, who nominated Hancock for the award.

Hancock receives about 400 small business proposals annually in response to approximately 60 topics from the two directorates. "We try to attract small business to work with the directorates and the system program offices such as the Airborne Laser. We have fostered a wide range of promising technologies in directed energy, space and launch vehicles, remote sensing, medicine and law enforcement," he said.



SBIR Facts & Figures

These figures depict the total FY01 dollars applied to SBIR Awards managed by the Air Force for each of the DoD Critical Technology Areas listed. The categories are those used by DoD.

	Phase I	Phase II	Phase III
Air Platforms	\$3,945,636.00	\$11,103,088.00	\$7,336,175.00
Chemical/Biological Defense	\$1,340,257.00	\$356,477.00	\$1,702,194.00
Information Systems Technology	\$9,922,920.00	\$32,748,189.00	\$378,687.00
Ground and Sea Vehicles.....	\$99,961.00	\$1,224,682.00	
Materials/Processes.....	\$9,616,779.00	\$20,281,805.00	
Sensors,Electronics, and Battlespace Environment	\$8,684,384.00	\$15,066,283.00	
Space Platforms.....	\$1,896,111.00	\$10,693,993.00	
Human Systems.....	\$1,397,409.00	\$1,341,100.00	
Weapons.....	\$1,879,032.00	\$10,526,005.00	
Biomedical	\$399,262.00		

Source: DoD SBIR Statistical Profile

"Development of Simulation Models for Close Formation Flight"

Air Force Requirement

As the Air Force's reliance on Unmanned Aerial Vehicle (UAV) and Unmanned Combat Aerial Vehicles (UCAV) increases, so do its simulation and modeling requirements. Operations of UAV and UCAV groups will require close formation flight to gain tactical advantage, attain performance benefits, and/or perform in-flight refueling. Since human operators are to be located in remote air or ground stations, advanced flight control algorithms need to be developed. To facilitate the development of robust control laws and reduce project risk, the Air Force requires advanced simulation and modeling capabilities for air vehicles in close formation.

SBIR Technology

Bihrl Applied Research Inc. (BAR) won SBIR contracts to improve the state of the art in developing simulations of air vehicles flying in close formation. BAR developed test techniques, apparatus, and data acquisition software that can be used during wind tunnel tests to measure aircraft aerodynamic

characteristics while in close formation. Data from wind tunnel tests can be used to refine preliminary computational estimates and refine algorithms. It can also be implemented directly into simulation models. BAR also addressed the need for advanced simulation tools for close formation flight. Based on its D-Six PC-Based simulation environment (a product of an SBIR Phase I in 1995), the company is developing a comprehensive simulation capability that allows users to load multiple independent simulations into a single application.

Air Force Payoff

The advanced simulation capability developed for the Air Force by BAR will greatly simplify the complex task of modeling multiple vehicles, while requiring less development time for engineers.

Technology Transfer /Commercialization

The Boeing Company, St Louis, MO, awarded BAR a contract to provide wind-tunnel data and formation flight model

information in support of an on-going effort with NASA Dryden Flight Research Center to develop autonomous formation flight capability. Several UAV developers that are now using Bar simulation software to support their UAV developmental simulation exercises. These include the Air Force's Automated Aircraft Collision Avoidance System (Auto ACAS) program, the Integrated Tactical Aircraft Control (ITAC) program, and the X-45 Program.

SBIR Partner

Bihrl Applied Research Inc.
Hampton, VA and
Jericho, NY

Employees:

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"With this technology, we can now simulate fleets of UAVs performing virtually any mission."

William Blake
AFRL/VACA
WPAFB, OH

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closed to new proposals in mid-January, most of those technologies, once developed, can be adapted and applied. Many of the technologies we are working on (FY 1998 and FY 2000) will soon be available for application to new and existing warfighting capabilities that enhance our homeland defense and anti-terrorism efforts.

Yes, We Have

Historically, most of the past Air Force topics address various aspects of homeland defense. However, SBIR does not focus on specific new products. Rather, SBIR has been used to develop building block technologies that provide improved capability to our systems and subsystems. Because SBIR is not a system or subsystem acquisition program, our previously developed SBIR technologies are available as those building blocks for today's acquisitions. Many of the technologies presently "sitting on the shelf" can easily be

adapted to meet the immediate homeland defense and anti-terrorism needs.

The Challenge

The Air Force acquisition community does not specify end products, nor do they specify which technologies should be used in those end products. They specify capability requirements. The product development community translates the Air Force capability requirements into proposed systems and subsystems. The challenge is threefold:

First, the prime contractors and system integrators that make up our product development community need to be more "open" to using SBIR technologies from small businesses.

Second, our country's small businesses need to be willing to partner with the product development community.

Third, for our Air Force acquisition community to encourage the development engineers that SBIR technology is available to do the job and to use the new acquisition strategy of spiral development to find those open doors of opportunity.

Bottom Line = Team Effort

In my opinion, it is a team effort to go from SBIR topic, to a proven

SBIR technology building block, to an end product capability. No one person or program can make it happen on his or her own. Acquisition program folks generate topics, laboratory folks manage the technology development, small business engineers and scientists develop the technology, and the product development community design and build new systems and subsystems for the Air Force acquisition folks to procure.



**Air Force
Research Laboratory | AFRL**
Science and Technology for Tomorrow's Aerospace Forces

Air Force SBIR Advantage

Air Force SBIR Program
AFRL/XPTT
1864 4th Street, Room 1, Bldg. 15
Wright-Patterson AFB OH 45433

Program Manager: Stephen Guilfoos
Website: www.afrl.af.mil/sbir

Comm: (800) 222-0336
Fax: (937) 255-2329
e-mail: stephen.guilfoos@wpafb.af.mil

The goal of the Air Force SBIR Program is to serve the technology needs of Air Force warfighters. It accomplishes its mission as part of the Air Force Research Laboratory's (AFRL) integrated research and development (R&D) team. AFRL's mission is leading the discovery, development, and integration of affordable warfighting technologies for our aerospace forces.

SBIR Advantage is published quarterly by the Air Force SBIR Program office. This publication offers an overview of AF SBIR issues and information. The purpose of *SBIR Advantage* is to provide Air Force, DoD, and other government leadership with additional insight into the vital contributions made by the SBIR program to Air Force R&D.

SBIR Advantage is available online at: www.afrl.af.mil/sbir

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